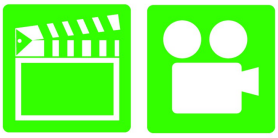
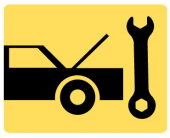
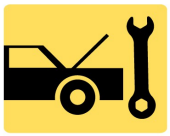
A6 Electricity & Electronics 4th Edition

Chapter 12 Capacitance & Capacitors

Opening Your Class

KEY ELEMENT	EXAMPLES
Introduce Content	This course or class covers operation and service of **Automotive Electricity and Electronics Systems.** It correlates material to task lists specified by ASE and NATEF.
Motivate Learners	Explain how the knowledge of how something works translates into the ability to use that knowledge to figure why the engine does not work correctly and how this saves diagnosis time, which translates into more money.
State the learning objectives for the chapter or course you are about to cover and explain this is what they should be able to do as a result of attending this session or class.	Explain the chapter learning objectives to the students. 1. Explain capacitance. 2. Explain how a capacitor can be used to filter electronic noise, can store electrical charge, and can be used as a timer circuit **This chapter will help you prepare for the ASE Electrical/Electronic Systems (A6) certification test content area "A" (General Electrical/Electronic System Diagnosis).**
Establish the Mood or Climate	Provide a *WELCOME,* Avoid put downs and bad jokes.
Complete Essentials	Restrooms, breaks, registration, tests, etc.
Clarify and Establish Knowledge Base	Do a round robin of the class by going around the room and having each student give their backgrounds, years of experience, family, hobbies, career goals, or anything they want to share.

ICONS	Ch12 Capacitance & Capacitors
	**1. SLIDE 1 CH12 CAPACITANCE/ CAPACITORS**
	2. SLIDES 2-3 EXPLAIN OBJECTIVES
	**Check for ADDITIONAL VIDEOS & ANIMATIONS @ http://www.jameshalderman.com/**
	WEB SITE IS CONSTANTLY UPDATED
	**4. SLIDE 4 EXPLAIN: CAPACITANCE**
	5. SLIDE 5 EXPLAIN Figure 12-1 Leyden jar can be used to store an electrical charge
	**6. SLIDE 6: EXPLAIN CAPACITOR CONSTRUCTION & OPERATION**
	7. SLIDE 7 EXPLAIN Figure 12-2 This simple capacitor, made of two plates separated by an insulating material, is called a dielectric.
	8. SLIDE 8 EXPLAIN Figure 12-3 As the capacitor is charging, the battery forces electrons through the circuit & **EXPLAIN Figure 12-4** When the capacitor is charged, there is equal voltage across the capacitor and the battery. An electrostatic field exists between the capacitor plates. No current flows in the circuit.
	9. SLIDE 9 EXPLAIN Figure 12-5 The capacitor is charged through one circuit (top) and discharged through another (bottom) & **EXPLAIN Figure 12-6** Capacitor symbols are shown in electrical diagrams. The negative plate is often shown curved.
	10. SLIDE 10 EXPLAIN FIGURE 12–7 A point-type distributor shown with the condenser from an old vehicle being tested on a distributor machine.
	**DEMONSTRATION: BUILD A CIRCUIT ON PROJECT BOARD USING A CAPACITOR AND DEMO HOW TO TEST IT**
	**HAVE STUDENTS DUPLICATE THE DEMO ON PROJECT BOARD**
	**ANIMATION:** HTTP://MEDIA.PEARSONCMG.COM/PH/CHET/CHET_MYAUTOMOTIVELAB_2/ANIMATIONS/A6_ANIMATION/CHAPTER12_FIG_12_8/INDEX.HTM
	ANIMATION: Capacitor

ICONS	Ch12 Capacitance & Capacitors
	11. **SLIDE 11** EXPLAIN Factors of Capacitance 12. **SLIDES 12-13** EXPLAIN Uses for Capacitors 14. **SLIDE 14** EXPLAIN **Figure 12-8** A capacitor blocks direct current (DC) but passes alternating current (AC). A capacitor makes a very good noise suppressor because most of interference is AC and the capacitor will conduct this AC to ground before it can reach radio or amplifier & EXPLAIN **Figure 12-9** 1 farad capacitor used to boost the power to large speakers. 15. **SLIDES 15-16** EXPLAIN Uses for Capacitors
	**DEMONSTRATION: SHOW STUDENTS SEVERAL DIFFERENT TYPES OF CAPACITORS THAT ARE USED IN AUTOMOTIVE APPLICATIONS.**
	17. **SLIDE 17** EXPLAIN: CAPACITORS IN CIRCUITS 18. **SLIDE 18** EXPLAIN **Figure 12-10** Capacitors in parallel effectively increase the capacitance & EXPLAIN **Figure 12-11** Capacitors in series decrease the capacitance.
	**BE SURE THAT CAPACITORS ARE FULLY DISCHARGED BEFORE WORKING NEAR THEM. INFORM STUDENTS THAT, BECAUSE A CAPACITOR STORES ELECTRICITY, IT CAN DELIVER A SHOCK TO A PERSON.**
	**NATEF TASK SHEET DIAGNOSE RADIO STATIC AND WEAK, INTERMITTENT, OR NO RADIO RECEPTION; DETERMINE NECESSARY ACTION**
	19. **SLIDE 19** EXPLAIN **SUMMARY**
	**HOMEWORK: SEARCH INTERNET** **HAVE THE STUDENTS USE INTERNET TO RESEARCH THE LEYDEN JAR. DISCOVER CONSTRUCTION OF ORIGINAL JAR & SCIENTISTS WHO CONSTRUCTED IT, AS WELL AS LATER MODIFICATIONS.**